

Name: _____

Hour: _____

Calculating Force



Definition of Force: **Force** is a product of mass and acceleration.

Force Equation

The equation for is **force = mass x acceleration** or **$f = ma$**

The standard unit for mass is kg.

The standard unit for acceleration is m/s^2 .

The standard unit for force is newton (N). A newton is a derived standard unit. This means that the SI unit of newton is composed of two or more standard units. $1N = 1\text{ kg} \times 1m/s^2$.

Let's look at the steps for solving a force problem. If you need to review solving one step multiplication problems, click on link below.

Steps for Solving Force Equation

Problem: How much force must be applied to a toy car that has a mass of .25kg to achieve an acceleration of $2.4m/s^2$?

Step 1: Write down the formula needed to solve the problem.

$$f = ma$$

Step 2: Place the known measurements into the formula.

Known : The mass of the car is .25kg and the acceleration of the car is $2.4m/s^2$. $f = (.25kg) (2.4m/s^2)$

Step 3: Enter the numbers into your calculator and solve.

$f = .6N$ A force of .6N must be applied to the toy car.

Make sure that all of your numbers in the equation have a SI unit and make sure you label your answer with the correct SI unit for force (N).

Now you can practice some problems on your own.

Force Practice Problems

You will need to show all work set up in the equation. Don't forget to label all numbers!

PROBLEMS:

1. If a 4500 kg car is traveling westward with an acceleration of 35.2 m/s^2 , what is the force acting on it?
2. I am a roller skater with a mass of 72kg. If I am accelerating toward a wall at 3.7m/s^2 , what will be the amount of force at which I hit the wall?
3. A dock worker needs to stop a box of goods that is rolling across a manual conveyer belt. The box has a mass of 8.35kg and is accelerating at $.75\text{m/s}^2$. How much force will he need to apply to the box in order to stop it?
4. How much force must be applied to move a 55kg ice skater to an acceleration of 12.5m/s^2 ?